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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/553,213

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Satoshi Aoyama

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OLIFF & BERRIDGE, PLC

P.O. BOX 320850

ALEXANDRIA, VA 22320-4850

EXAMINER

SIDDIQUEE, MUHAMMAD S

ART UNIT

PAPER NUMBER

1795

NOTIFICATION DATE

DELIVERY MODE

05/17/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

OfficeAction25944@oliff.com

jarmstrong@oliff.com

Office Action Summary	Application No. 10/553,213	Applicant(s) AOYAMA ET AL.	
	Examiner MUHAMMAD SIDDIQUEE	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 2/12/2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-11 is/are pending in the application.
- 4a) Of the above claim(s) 11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's amendment filed on 2/12/2010 was received. Claim 1 is amended and claim 5 is cancelled. Claims 1-4 and 6-10 are pending in this application.

Response to Arguments

1. Applicant's arguments filed 2/12/2010 have been fully considered but they are not persuasive. Isom teaches that the fuel processing system (14) comprises a reformer (32) which converts the fuel feedstock, water (in the form of steam), and air to H₂ and CO. [paragraph 0021]. This conversion to carbon monoxide is partial oxidation reaction. The controller (50) controls the fuel feed flow to the reformer which means that it controls the operation of the reformer unit to cause a partial oxidation reaction of the selected material with supplied oxygen for production of hydrogen. [see also paragraph 0003]. Isom further teaches "In order to further process the effluent from ATR 32 to further shift the CO to CO₂ and to enhance the yield of H₂, the FPS 14 typically also includes additional components 34, that may include a shift converter, a selective oxidizer and/or other components, not shown in detail" [paragraph 0021]. Therefore, Isom teaches both partial oxidation and steam reforming reactions.

2. The applicant also asserted that Kimioki does not teach that the catalyst is a methane reforming catalyst including at least one of Ni, Rh, Ru and their alloys. The applicant's attention is directed to paragraph (0041) where nickel is used as a methane reforming catalyst.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-4 and 6-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 1 recites the limitation "a supply unit that supplies oxygen and steam to the reformer unit" in line 9. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation

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under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimioki et al (JP 2003-059519) in view of Isom et al (US 2004/0038091 A1).

Regarding claims 1-4 and 5-7, Kimioki discloses a fuel cell comprising anode, cathode, stabilized zirconia (YSZ) electrolyte and nickel/stabilized zirconia (Ni/YSZ) hydrogen permeable metal layer. Kimioki teaches a starting combustion part (7) (reformer or fuel gas supply module) that supplies a fuel gas containing hydrogen and methane (hydrocarbon compound) to the anode. Kimioki also teaches an oxidizing gas supply module that supplies an oxidizing gas to the cathode. Kimioki further teaches internal reforming section within the fuel electrode where steam reforming of methane in the fuel gas is carried out which is an endothermic reaction. Kimioki also teaches a control section which controls the various sections/operations of the fuel cell system [Fig. 1; paragraph 0020, 0030, 0031, 0041]. Kimioki does not teach a steam reforming reformer, however, various kinds of reformers are used to generate fuel gas for the fuel cells. Isom discloses a fuel cell system comprising a fuel processing system (14) (including a reformer (32) and shift converter (34)) which converts fuel feed stock, steam and air into hydrogen and carbon dioxide; a control system which controls the reformer based on the internal temperature of the reformer [Abstract; Fig. 1; paragraph 0011, 0021, 0024]. Though Isom specifically did not disclose any oxygen supply unit, it

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is inherent that an oxygen supply unit must be present in the system as evidence from (US 2004/0053088 A). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a reformer and a control system as taught by Isom in order to achieve efficient operation of the fuel cell.

Regarding claim 8, the reaction in the reformer is a heat involved reaction because of the partial oxidation of fuel with oxygen and steam reforming reaction [paragraph 0021].

10. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimioki et al (JP 2003-059519)) in view of Isom et al (US 2004/0038091 A1) as applied in claim 1 and further in view of Ito et al (US 2003/0061937 A1).

Regarding claim 9-10, Kimioki/Isom remains silent about the detail of the hydrogen permeable membrane. However, Ito discloses a fuel cell system comprising a hydrogen permeable membrane. The hydrogen-permeable membrane includes a metal base layer (electrolyte layer) containing a Group VA element (inorganic material), two metal middle layers (hydrogen permeable metal layer) which are formed on both of the two sides of the metal base layer (electrolyte layer) [Abstract; paragraph 0043-0045]. Ito also teaches that water is supplied in the permeable membrane and it retain there [paragraph 0030, 0031, 0034]. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a hydrogen permeable membrane as taught by Ito in the fuel cell of Kimioki/Isom in order to extract the hydrogen gas from mixed gases which have been generated in the reforming portion.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MUHAMMAD SIDDIQUEE whose telephone number is (571) 270-3719. The examiner can normally be reached on Monday-Thursday, 7:30 am to 4:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Muhammad Siddiquee/
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795